Remarks

Claims 8-11, 14-16, 27-30, 41-42, and 45 are amended. Claims 1-45 are pending.

In response to the restriction requirement mailed June 29, 2001, Applicant elects species "d" as identified by the Examiner, directed to Figures 7-11. At least claims 8-11, 14-16, 27-30, 32-33, 36, 38, 41, 42 and 45 read on the elected species. The claim numbers referred to herein conform with the claim numbering mentioned by the Examiner in the action. Applicant apologizes for any confusion caused by the previously misnumbered claims.

Applicant reserves the right to pursue the non-elected claims in one or more later filed divisional applications.

Applicant has amended the claims that are readable on the elected embodiment in order to place the claims into better form prior to substantive examination.

Conclusion

With these amendments Applicants believe that the application is in condition for allowance. Favorable consideration is respectfully requested. If any further questions arise, the Examiner is welcome to contact Applicants' representative at the number listed below.

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Respectfully Submitted,

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Marked-up version showing changes

In the Claims

Claims 8-11, 14-16, 27-30, 41-42, and 45 are amended as follows.

8. (Amended) An apparatus for [successively feeding] mixing batches of a liquid and a powder component [into an interior of a mixing vessel] for preparation of [a] bone cement, [said mixing vessel interior maintained under a vacuum created from a vacuum source,] comprising:

a mixing vessel pre-filled with [a] the powder component of [said] the bone cement, said vessel defined by an outer wall having a top end, a bottom end and an interior, said top end formed with a sealable spout, said bottom end formed with an axially displaceable bottom;

a vacuum source connected to the interior of said mixing vessel for maintaining the interior of said mixing vessel under vacuum;

[a] an agitator [received] at least partially disposed within said vessel interior, said agitator [comprised of] comprising a tubular rod which extends upwardly out of said interior[,] through said spout, and an agitator disk attached to said tubular rod and disposed within the interior, [an open,] a first end of said tubular rod being open and defining a mouth, and [an open,] a second end of said tubular rod being open and encircled by said disk, and said tubular rod is axially displaceable within said vessel interior [for mixing said bone cement components];

[a tightening rod disposed within said tubular rod for sealing said open bottom rod end from communication with the atmosphere;]

a generally cylindrical container having a top, a bottom, and an interior[, said inner container axially displaceable between a first and a second position, said bottom end in communication with said mixing vessel while in said first position, and while in said second position, said top end axially is displaced above said mixing vessel

and no longer in communication therewith, said bottom end in communication with the atmosphere in both of said positions];

a glass ampoule having a sealed interior and a tip, said sealed interior containing [said] the liquid bone cement component, said ampoule received within said interior of said [inner] container [with said tip facing said inner container top end]; and

a cap [having threads formed on an outside surface thereof, said cap threadably received within said bottom end of] secured to the top of said [inner] container, said cap having an opening therein whereby atmospheric air is communicated through said cap and into said interior of said [inner] container[, said inner and outer containers having respective top ends which are funnel-shaped and respective lower portions defining respective neck members, said funnel-ends concentrically arranged such that said inner container neck member is frictionally received within said neck of said outer container when said inner container is in said first position, said frictional contact creating a seal therebetween such that said powder component is prevented from discharging out of said outer container, said inner and outer container neck members simultaneously in communication with said mixing chamber, said frictional contact creating a seal therebetween such that said powder component is prevented from discharging out of said outer container;

wherein said sealing rod is removed from said tubular rod and replaced with said container, said contents of said ampoule being downwardly fed into said tubular rod and entering said vessel interior near said bottom, as said liquid exits said open, second end, said leg and powder components mixing within said interior under vacuum, wherein air is communicated through said container and into said vessel through said tubular rod so that no harmful emissions escape to said atmosphere during mixing].

9. (Amended) A method for [successively feeding in an arbitrary sequence] preparing bone cement by mixing batches of a liquid and a powder bone cement component [into a mixing vessel maintained under vacuum for the preparation of

said bone cement wherein said mixing vessel is provided with a pre-determined amount of said powder component of said cement], the method comprising the steps of:

providing a mixing vessel that is maintained under vacuum and that contains a pre-determined amount of the powder bone cement component, [which] said vessel [is defined by] comprising a [cylindrical] cylinder having an open interior with a spout [attached to] at one end of said cylinder[,] and having an axially displaceable bottom;

[inserting] providing a mixing agitator within [said spout so as to communicate with] said vessel interior, said agitator comprised of a tubular rod having an agitator disk fixed on one end thereof, [said other end] an opposite end of said tubular rod being open and defining a mouth, said mouth being located axially above said spout of said vessel, said agitator being axially displaceable within the vessel interior such that said agitator disk can mix [both of said] the bone cement components together;

providing a tightening rod within said tubular rod so as to seal said vessel from [said] atmosphere before said liquid component is introduced into said vessel;

removing said tightening rod and then introducing said liquid component into said interior of said vessel [near said vessel bottom];

re-inserting said sealing rod within said tubular rod, thereby sealing said vessel from [said] atmosphere; and

axially displacing said agitator so as to mix said liquid and powder components under vacuum, without allowing harmful emissions to escape said mixing vessel.

10. (Amended) The [method of] apparatus according to claim 8, wherein said [inner container has an open interior for receiving a glass ampoule and a threadable cap for pushing downwards on said ampoule, said] interior of said container including [a] means for breaking said ampoule when said cap pushes on said ampoule, thereby allowing said container to feed said liquid component into said vessel.

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11. (Amended) The method of claim 9 further comprising [the step of] providing a container that contains said liquid component, and placing said container in said mouth of said tubular rod.

14. (Amended) An apparatus for [successively feeding batches of a liquid and a powder component into an interior of a mixing vessel for preparation of a] preparing bone cement from liquid and powder bone cement components, [said mixing vessel interior maintained under a vacuum created from a vacuum source in order to prevent harmful emissions from escaping from said vessel once said liquid and powder components are mixed,] comprising:

a mixing vessel pre-filled with [a] the powder component of said bone cement, said vessel defined by an outer wall having a top end, a bottom end and an interior, said top end formed with a sealable spout, said bottom end formed with an axially displaceable bottom;

a vacuum source connected to the interior of said mixing vessel for maintaining the interior of said mixing vessel under vacuum;

means for introducing said liquid component into said interior of said mixing vessel through said sealable spout; and

an agitator at least partially received within said vessel interior, said agitator comprised of a tubular rod which extends upwardly out of said interior through said spout and is in communication with the atmosphere and an agitator disk attached to said tubular rod, [an open,] a first end of said tubular rod being open and defining a mouth and [an open,] a second end of said tubular rod being open and encircled by said disk, said [tubular rod] agitator disk is axially displaceable within said vessel interior for mixing said bone cement components[;

a removable tightening rod disposed within said tubular rod for sealing said open bottom rod end from communication with the atmosphere after said liquid component is introduced into the mixing vessel, said tightening rod being disposed within said tubular rod prior to introducing said liquid into said mixing vessel,

wherein said tightening rod is removed from said tubular rod immediately prior to introducing said liquid bone cement compound into said mixing vessel and is reinserted therein after said liquid is introduced within said mixing vessel, wherein said power and liquid components are then mixed within said vessel interior under a continuous vacuum from said vacuum source and said atmospheric air is prevented from entering into said vessel due to said tightening rod, wherein said harmful emissions caused from mixing said components are prevented from escaping said vessel].

15. (Amended) The apparatus of claim 14 wherein said means for introducing said liquid component into said vessel is comprised of a container having an interior for containing said liquid component, a tip, and a tube connected to said tip, said tube connecting said container to said mixing vessel.

16. (Amended) The apparatus of claim 15 wherein said tube [has a one end of said container] is adapted to be inserted into said [open top end] mouth of said tubular rod.

27. (Amended) A method for introducing into a mixing vessel [(2)] under partial vacuum a liquid component [(A)] of bone cement to be mixed with a powder[-]component [(B)] of bone cement, the method comprising:

[the steps of] providing a container [(9)] which has an open interior, a threadable cap [(I 8)] and means [(13)] for breaking a glass ampoule;

placing a glass ampoule [(11)] containing said liquid component [(A)] into said open interior[,];

turning said cap [(18)] for pushing downwards on said ampoule [(11)] for breaking it against said [breaking] means [(13b)] for breaking; and

allowing said container [(9)] to feed the liquid component [(A)] through an opening [(13c)] in the container into said mixing vessel [(2)].

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28. (Amended) A method according to claim 27 [wherein] further comprising connecting said container [(9)] opening [(13c) is airtight connected] to the mixing vessel [(2)] in an airtight manner, and allowing ambient air [is allowed] to enter into said open interior of the container [(9)] through an opening [(18d)] in the cap [(18)] of the container [(9)].

29. (Amended) An apparatus for introducing into a mixing vessel [(2)] under partial vacuum a liquid component [(A)] of bone cement to be mixed with a powder component, wherein said apparatus [comprising] comprises:

a container [(9)] which has an open interior for receiving at least one glass ampoule [(11)] containing said liquid component and a threadable cap [(18)] for pushing downwards on said ampoule [(11)], said interior including [a] means [(13b)] for breaking said ampoule [(11)] when said cap [(18)] pushes on said ampoule [(11) thereby allowing said container [(9)] to feed the liquid component (A) through an opening in the container, into said mixing vessel (2)].

30. (Amended) An apparatus according to claim 29 wherein the container includes an opening [is arranged to be air-tight] that is adapted to be connected in an air tight manner to the mixing vessel, and [in that] wherein the cap [(18) of the container] has an opening [(18d)] for allowing ambient air to enter into said open interior of the container [(9)].

41. (Amended) An apparatus for mixing a liquid and a powder component [(A, B)] for the preparation of [a] bone cement under vacuum in order to prevent harmful emissions from escaping once said liquid and powder components [(A, B)] are mixed, comprising:

a mixing vessel [(2)] defined by an outer wall [(3)] having a top end, a bottom end and an interior, said top end formed with a sealable spout [(5)], said bottom

end formed with an axially displaceable bottom [(4)], said mixing vessel containing the powder bone cement component;

[a] means [(1)] for introducing [by aid of vacuum present in the vessel] said liquid component [(A)] into said interior of said mixing vessel [(2)] through said sealable spout [(5)];

an agitator [(6)] at least partially received within said vessel interior [(2a)], said agitator [(6)] comprised of a tubular rod [(6b)] which extends upwardly out of said interior through said spout [(5)] and is in communication with the atmosphere and an agitator disk [(6a)] with holes attached to said tubular rod [(6b)], [an open,] a first end of said tubular rod being open and defining a mouth and [an open,] a second end of said tubular rod being open and encircled by said disk [(6a)], said tubular rod [(6b)] being axially displaceable within said vessel [(2)] interior for mixing said bone cement [(A, B)] components;

a removable tightening rod [(19)] disposed within said tubular rod [(6b)] for sealing [said open bottom rod] at least one open end thereof from communication with the atmosphere prior to and after said liquid component [(A)] is introduced into said mixing vessel [(2)], said tightening rod [(19)] being removed from said tubular rod [(6b)] immediately prior to introducing said liquid bone cement [(A) compound] component into said mixing vessel [(2)] and being reinserted therein after said liquid [(A)] component is introduced within said mixing vessel[, characterized in that said vessel is pre-filled with said powder bone cement component (B) and in that between said vessel bottom (4) and said open second end of said tubular rod (6b) there is]; and

wherein a gap [(23) behaving like a passage] is provided between the vessel bottom and the second end of said tubular rod for percolating an air/liquid mixture upwardly through the holes [(6h)] in the agitator disc [(6a)] to cause the liquid component [(A)] to [premix] mix with the powder component [(B)].

42. (Amended) The apparatus of Claim 41, [characterized in that] wherein said means [(1)] for introducing said liquid [(A)] component into said vessel [(2)

is comprised of] comprises a container [(9)] having an interior for containing said liquid [(A)] component, [the] an end of said container being insertable into said [open top] first end of said tubular rod [(6b)].

45. (Amended) A method for mixing a liquid and a powder bone cement component [(A, B)] in a mixing vessel [(2)] that is maintained under vacuum for the preparation of [said] bone cement, the method comprising:

[the steps of] providing a mixing vessel [(2) which said vessel is] defined by a [cylindrical] cylinder having an open interior [(2a)] with a spout [(5)] attached to one end of said cylinder[,] and having an axially displaceable bottom [(4)];

providing a mixing agitator [(6)] and inserting it within said spout so as to communicate with said vessel interior [(2a)], said agitator [(6)] comprised of a tubular rod [(6b)] having an apertured agitator disk [(6a)] fixed on one end thereof, [said other end] an opposite end of said tubular rod being open and defining a mouth, said mouth being located axially above said spout of said vessel;

providing a tightening means [introducing said liquid bone cement component (A) into the vessel (2)] in said tubular rod so as to seal said vessel [(2a)] from said atmosphere [before and after said liquid component (A) is introduced into said vessel (2a)];

removing said tightening means [during introduction of] and thereafter introducing said liquid component [(A)] into said interior of said vessel [(2a) near said vessel bottom (4) under the influence of partial vacuum];

re-inserting said sealing means within said tubular rod, thereby sealing said vessel [(2a)] from [said] atmosphere;

axially displacing said agitator [(6)] so as to mix said liquid and powder components [(A, B)] under vacuum[, characterized in that said mixing vessel (2) is provided with a predetermined amount of said powder component of said cement and in arranging between said vessel bottom and said open second end of said tubular rod (6b) a gap (23) behaving like a passage for percolating an air/liquid mixture upwardly through

holes (6h) in the agitator disc (6a) to cause liquid component (A) to premix with the powder component (B)].